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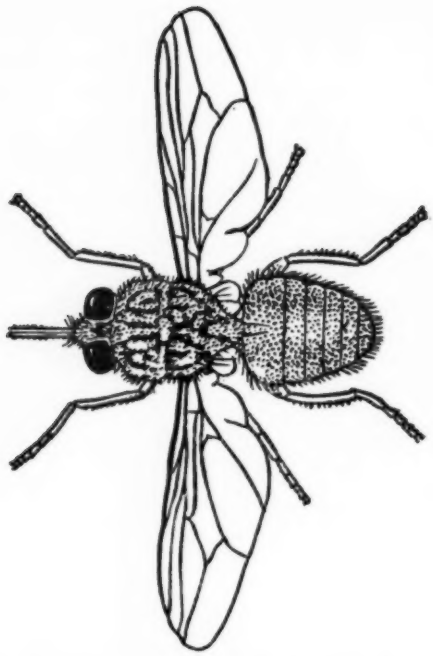
October 25th, 1958



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No. 43 OCTOBER 25th, 1958 Vol. 70

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The Anthelmintic Properties of Hygromycin B in Horses

BY

D. POYNTER

Animal Health Trust, Equine Research Station, Newmarket*

SUMMARY.—The addition of Hygromycin B† to the diet of horses at the level of 30 grammes per day resulted in a gradual suppression in strongyle egg production.

Introduction

STREPTOMYCES hygroscopicus was isolated from forest soil near Indianapolis, Indiana. It is the source of certain antibiotics one of which, Hygromycin B, is an effective anthelmintic. Hygromycin was first isolated by Mann, Gale and Van Abeele (1953). Preliminary studies by Pittenger *et al.* (1953) indicated that a number of gram-positive and gram-negative bacteria and certain actinomycetes were sensitive to the antibiotic. McCowen, Callender and Brandt (1956-7) tested Hygromycin in laboratory animals and found it effective against *Entamoeba histolytica* and *Leptospira pomona*, it also controlled infections of *Borrelia novyi* as well as oxyurids in mice.

Goldsby and Todd (1957) stated that Hygromycin had an action on lungworms, whipworms, Strongyloides and possibly ascarids in swine. The drug also suppressed the egg-production of Oesophagostomum. McCowen *et al.* (1957) also using swine found that a crude dried broth of *Streptomyces hygroscopicus* containing Hygromycin B administered in the feed possessed anthelmintic properties against Ascaris, Oesophagostomum and Trichuris. Pigs on medicated feed demonstrated after 3 weeks greatly reduced numbers of eggs for each species of parasite when compared with control pigs. The feed was acceptable to the swine and no toxic manifestations were observed. Kelley *et al.* (1958) carried out a field trial in swine and showed that Hygromycin B when fed at the rate of 12,000,000 units per ton of feed for 60 days eliminated *A. suum*. A symposium on "Hygromix" has been published by Eli Lilly Company (1957) but as yet no report of the effects of the product on the nematode population of the horse has been published. The purpose of the present communication is to describe such work.

Materials and Methods

The product used in the trials about to be described was "Hygromix" which contains Streptomyces fermentation products and soybean millfeed and has as its active ingredient 2,400,000 units per pound of Hygromycin B.

The dosage rates used were originally estimated on the basis of mixing 5 lb. of "Hygromix" to 2,000 lb. of feed. An adult Thoroughbred or hunter (1,000 lb. bodyweight), consumes about 20 lb. of food per day and it was, therefore, apparent that each animal would have to receive 0.05 lb. of "Hygromix" (22.7 g.) per day. "Hygromix" was given mixed with moist crushed oats and bran.

The numbers of eggs per gramme of faeces were estimated by the Clayton Lane D.C.F. and the Stoll techniques.

Since it was desired to obtain information on the species of strongyles present in any given horse and since the eggs of these strongyles are morphologically indistinguishable from each other, faeces charcoal cultures were prepared and identification of the ensuing third stage infective larvae carried out.

Egg counts and cultures were carried out each day on test animals. The results of the individual egg counts are shown on the graphs. The results for larval differentiation have been averaged so that each result for a given week represents the average of 7 daily estimations.

Experiments were conducted on cross-bred ponies

* Present address: Allen & Hanburys Ltd., Ware, Herts.

† Hygromix: Eli Lilly & Co.

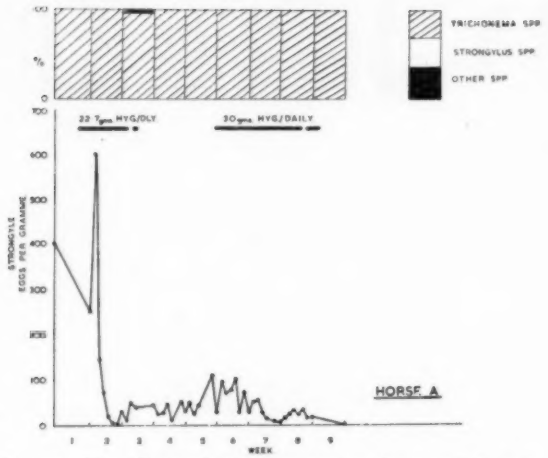

FIG. 1.—The effects of "Hygromix" on the strongyle egg output of an adult hunter.

of about 500 lb. bodyweight, and Thoroughbreds and hunters of about 1,000 lb. bodyweight. The results for the individual animals will now be considered.

Results

A. *Hunter gelding, 7 years.*

The complete results are shown in Fig. 1. A fall in egg count associated with the addition of "Hygromix" to the diet was observed. No change in the differential picture was noted. The withdrawal of the antibiotic led to a small rise in egg count which was eliminated by a further course of "Hygromix." This animal showed a reluctance to consume the medicated feed. It was housed for a year before and also during the period of observation.

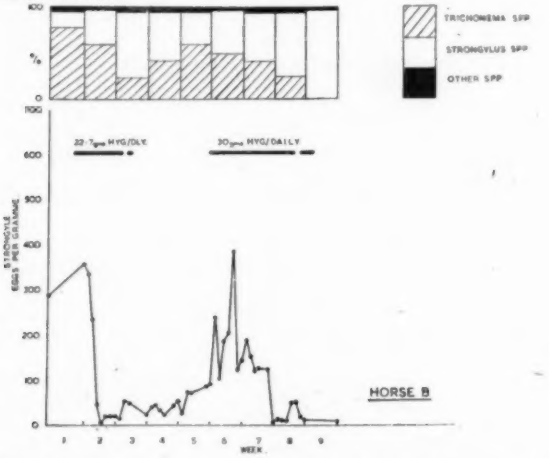

FIG. 2.—The effects of "Hygromix" on the strongyle egg output of an adult Thoroughbred.

B. *Thoroughbred gelding, 7 years.*

The addition of "Hygromix" to the diet produced a fall in egg count associated with an increase in the proportion of larvae of the genus Strongylus seen in cultures (Fig. 2). The withdrawal of the antibiotic led to a rise in egg count associated with an increase in the percentage of larvae of the genus Trichonema seen in cultures. A further course of "Hygromix" produced a further fall in the number of nematode eggs per gramme associated with a fall in the proportion of Trichonema spp. larvae and a rise in the proportion attributable to the genus Strongylus. This animal was housed during the period of observation and for 9 months prior to the start of the experiment. A reluctance to consume the medicated food was observed.

C. *Pony colt, 2 years.*

This pony was given 11.7 g. of "Hygromix" per day for about 20 weeks, and consumed the medicated diet without hesitation. The fall in the number of strongyle eggs passed was dramatic but was related to an increase in the proportion of Strongylus spp. larvae in cultures (Fig. 3). The pony was housed during the night but was allowed out to grass during the day. Towards the end of the period of observation the proportion of Trichonema spp. larvae in cultures was increasing.

D. E. and F. *Pony fillies, 3 years.*

These 3 ponies were all treated in a similar fashion (Figs. 4, 5 and 6). The addition of 15 g. of "Hygromix" per day to the diet for 7 weeks produced a fall in the number of strongyle eggs per gramme which was by no means absolute. Increasing the level of administration to 30 g. per day for a further 7 weeks reduced the egg counts to negligible levels. Falls in egg counts were associated with increases in the proportion of Strongylus spp. larvae seen in cultures. These animals were housed only at night.

Ponies D and F readily consumed the medicated diet but pony E was reluctant to do so. However, moistening the feed and a period of starvation produced the desired result and once the pony became accustomed to the "Hygromix" no further trouble occurred.

Control Animals.

Whilst observations were being made on animals A to F faeces from 4 control animals were also examined. Two of the animals were kept housed and the other 2 remained at grass. In no case did the number of strongyle eggs seen in the faeces fall to the negligible levels seen in the test animals.

G. *Thoroughbred mare, 15 years.*

The results for this horse are shown in Fig. 7. "Hygromix" reduced the number of strongyle eggs passed in faeces whilst the withdrawal of the antibiotic led to a rise in the number of such eggs.

H. *Thoroughbred mare, 19 years.*

This animal was treated in a similar manner to animal G. A reduction in the output of strongyle eggs occurred and an increase in the proportion of eggs attributable to the genus Strongylus was seen (Fig. 8). The withdrawal of the antibiotic produced a rise in egg count associated with an increase in eggs of the genus Trichonema, as it did in animal G.

Control Animals, I (Hunter mare, 26 years) and J (Thoroughbred mare, aged).

Horses G and H, together with the control animals I and J, were housed during November, 1957, and kept inside until the following May. Figs. 9 and 10 (pages 869 and 870) record the complete observations carried out on the control animals. They show that although considerable fluctuations in egg counts occurred no dramatic reductions in such counts were produced and also that no great changes in the differential pictures were recorded.

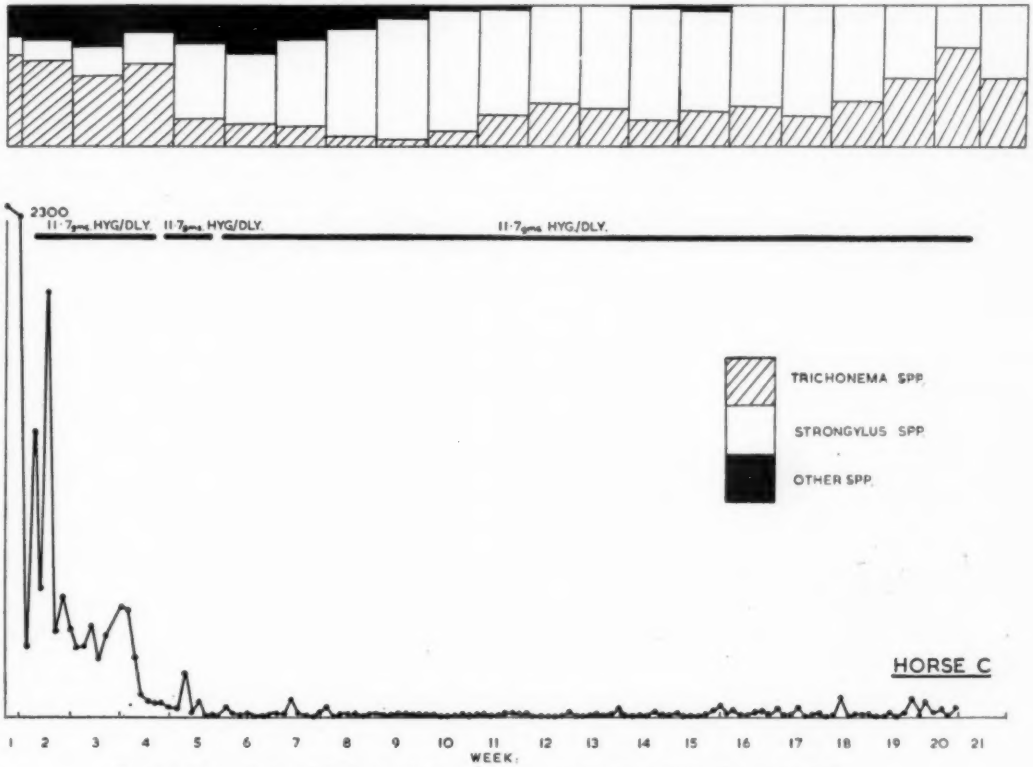

FIG. 3.—The effects of "Hygromix" on the strongyle egg output of a pony colt.

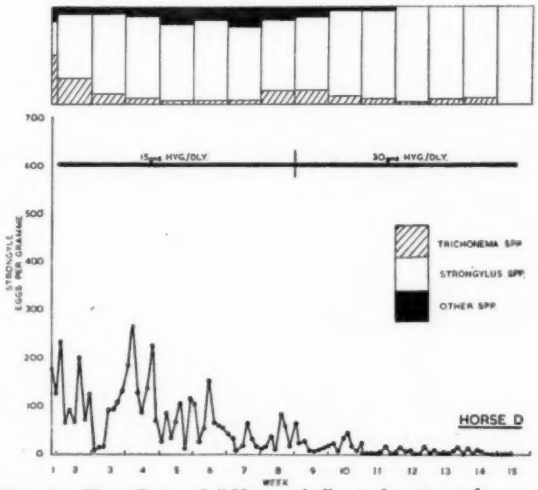

FIG. 4.—The effects of "Hygromix" on the strongyle egg output of a pony filly.

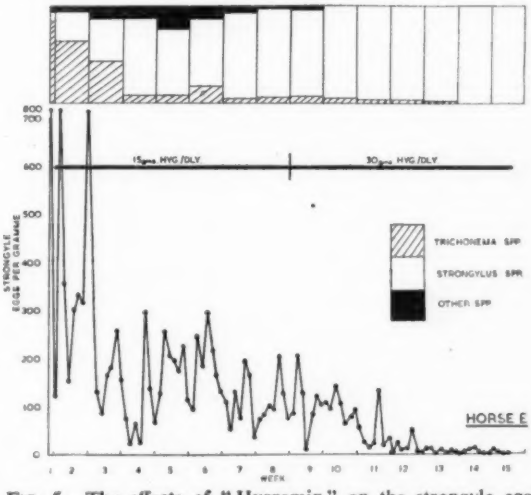

FIG. 5.—The effects of "Hygromix" on the strongyle egg output of a pony filly.

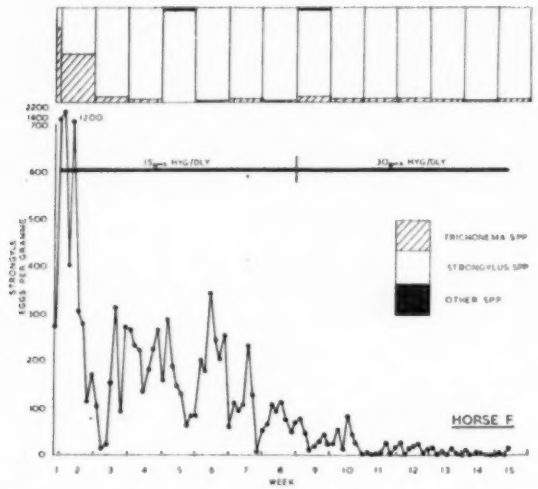

FIG. 6.—The effects of "Hygromix" on the strongyle egg output of a pony filly.

Discussion

The factual observations made during these trials clearly showed that "Hygromix" possessed some deleterious effect upon the strongyle nematodes present in horses in that egg production was reduced to negligible levels. There was some evidence that the effect on the genus Strongylus was less than that upon the genus Trichonema. Egg production was resumed when "Hygromix" was withdrawn from the diet.

The preliminary work carried out did not yield any information upon the question of whether egg laying is only temporarily arrested, while the majority of the worms survive, or whether a considerable proportion of the egg-producing worms are killed. Further work will be required to elucidate this point.

Some reluctance to consume normal foods containing "Hygromix" was encountered in some of the horses used.

Conclusions

(i) The addition of "Hygromix" to the diet of horses produces a well-marked fall in the number of strongyle eggs seen in the faeces.

(ii) There is evidence that effect of "Hygromix" on nematodes of the genus Trichonema is greater than that on the genus Strongylus.

Acknowledgments.—I am grateful to Wm. C. Miller, M.R.C.V.S., F.R.S.E., for criticism and encouragement. The "Hygromix" was supplied as a gift by Eli Lilly and Co. and for this the author is grateful. The technical help of Miss M. Powney and Miss L. Smith is acknowledged with thanks.

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MANN, R. L., GALE, R. M., VAN ABEELE, F. R. (1953). *Antibiotics and Chemotherapy.* **3.** 1,279–82.

(*Concluded on page* 869 *and* 870)

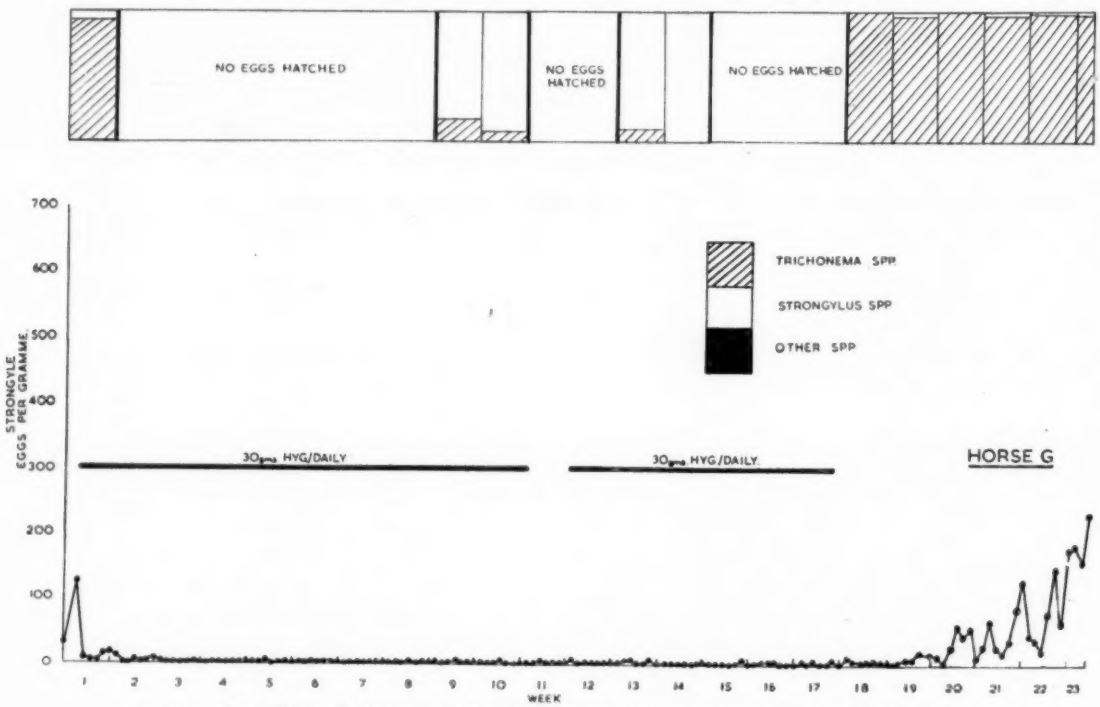

FIG. 7.—The effects of "Hygromix" on the strongyle egg output of a Thoroughbred mare.

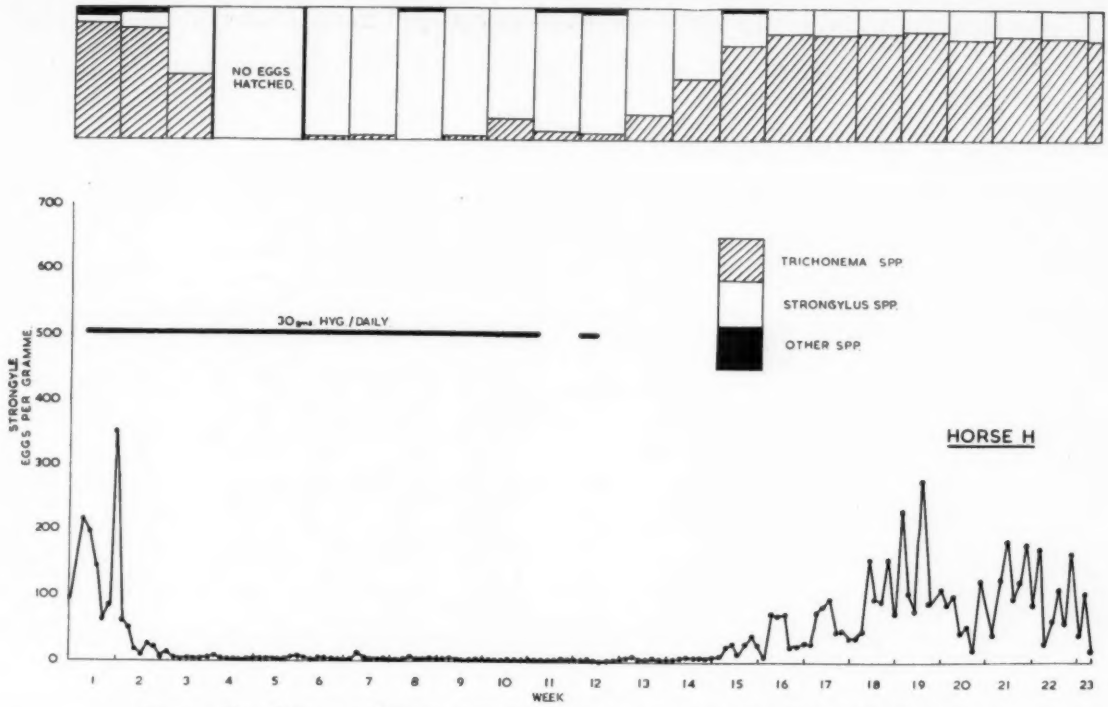

FIG. 8.—The effects of "Hygromix" on the strongyle egg output of a Thoroughbred mare.

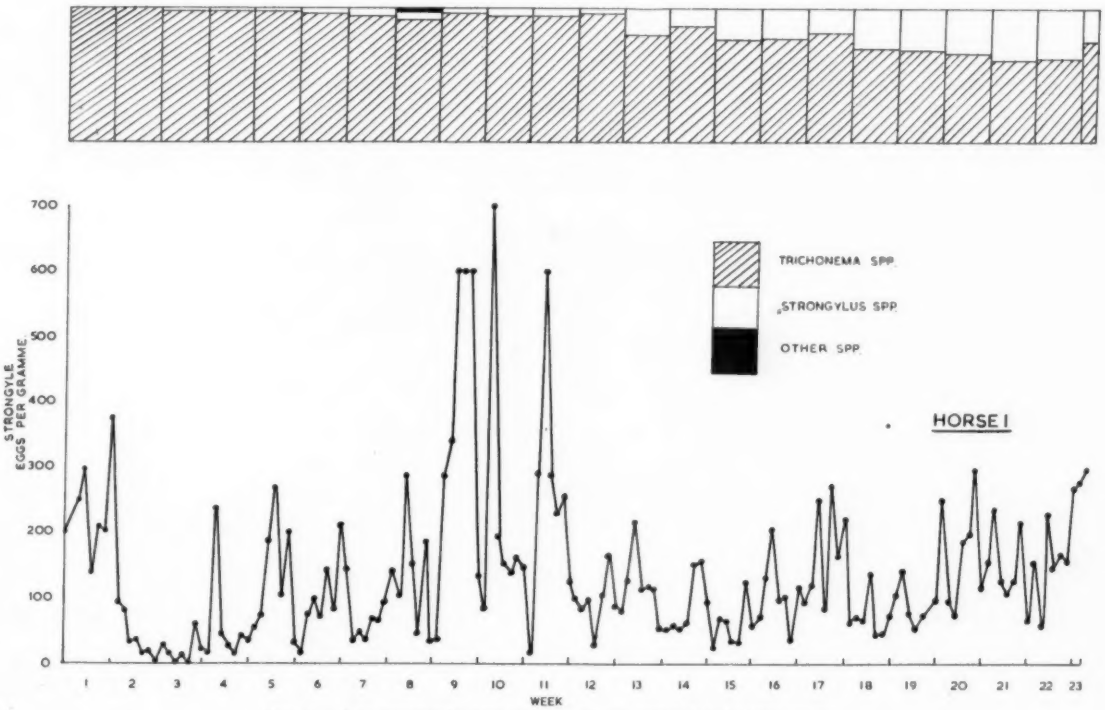

FIG. 9.—The strongyle egg output of an untreated hunter mare.

Prophylaxis Against Trypanosomiasis in Zebu Cattle

A Comparison of Prothidium, the Suraminates of Ethidium and RD 2902, and Antrycide Prosalt

BY
JOHN ROBSON
Veterinary Research Laboratory, Mpwapwa,
Tanganyika Territory
AND
M. J. HOPE CAWDERY
East African Trypanosomiasis Research Organisation,
Tororo, Uganda

SUMMARY.—Immature Zebu bullocks treated with a single dose of prothidium and the suraminates of ethidium and RD 2902, were compared with similar cattle treated prophylactically with 2-monthly doses of antrycide prosalt and with untreated controls, in an area of high natural challenge.

The apparent density of G. swynnertoni *was* 177, *and of* G. pallidipes *was* 34, *with an infection rate of* 2.44 *per cent. and* 3.05 *per cent. respectively, and it was calculated that* 0.071 *infected flies would feed on each animal each day.*

Under these conditions, a single dose of prothidium at 4 *mg. per kg. appeared to give the longest prophylactic effect; prothidium at* 2 *mg. per kg. appeared to be little more effective than a single dose of antrycide prosalt; ethidium suraminate at* 5 *mg. and* 10 *mg. per kg., while being slightly more effective as a prophylactic than prothidium at* 4 *mg. per kg., caused such severe local reactions as to preclude its use, unless its local toxicity can be reduced by improved manufacture. The suraminate of RD* 2902 *at doses of* 10 *mg. and* 20 *mg. per kg. was found to be toxic*

The Anthelmintic Properties of Hygromycin B in Horses—*Concluded.*

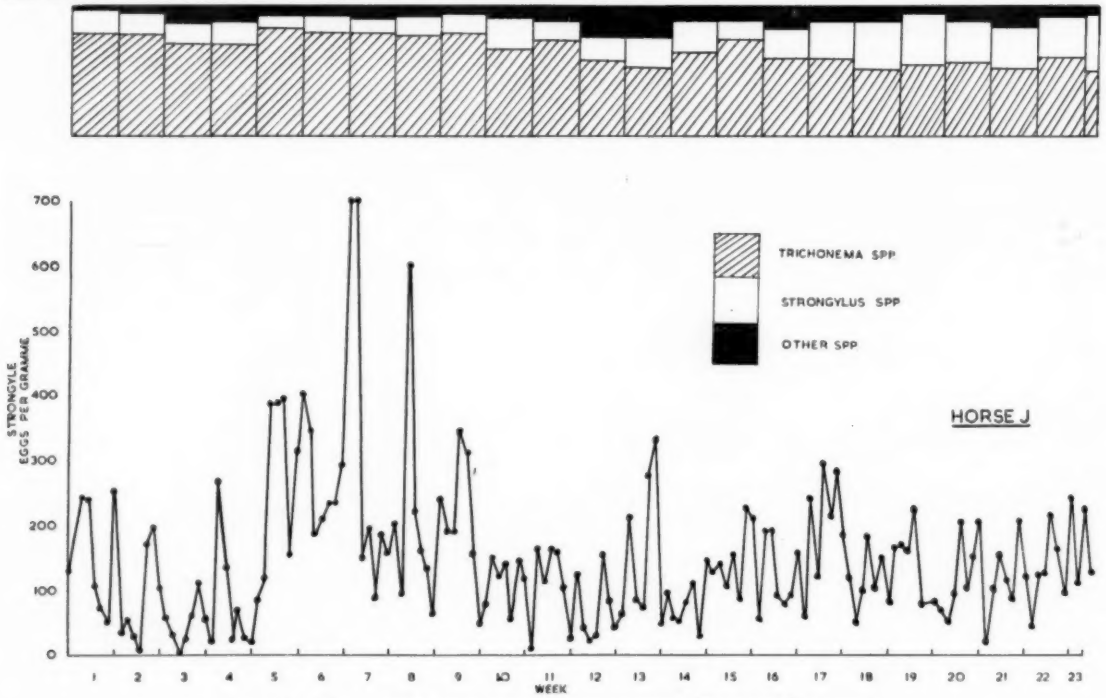

FIG. 10.—The strongyle egg output of an untreated Thoroughbred mare.

McCOWEN, M. C., CALLENDER, M. E., & BRANDT, M. C. (1956–7). "The Antiparasitic Activity of the Antibiotic Hygromycin," Antibiotics Annual, New York, Medical Encyclopedia, Inc. 883–6.

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PITTENGER, R. G., WOLFE, R. M., HOEHN, M. M., MARKS, P.N., DAILY, W. A., & McGUIRE, J. M. (1953). *Antibiotics and Chemotherapy*, **3.** 1,268–78.

Addendum

Lindquist (*J.A.V.M.A.* **132.** 72-5) recently found that Hygromycin B had no effect on the migratory phase of ascarids in pigs.

in use although apparently effective as a prophylactic. Antrycide prosalt used at 2-monthly intervals did not give complete protection.

Local reactions were noted in all treated animals, but were most severe in the groups inoculated with the suraminates.

Forty untreated bullocks, introduced in groups at monthly intervals, all became infected in a mean period of 23.9 days varying from 12 to 69 days.

Introduction

THE experiment was designed to test out, under field conditions, the prophylaxis obtained by single injections of three drugs which have been recently introduced. Antrycide prosalt, injected at 2-monthly intervals, was used as a standard.

The drugs used were prothidium (Watkins & Woolfe, 1956), ethidium suraminate (Williamson & Desowitz, 1956), and the suraminate of RD 2902. Prothidium was found to have a marked prophylactic action against syringe-passaged *Trypanosoma congolense* by Robson and Milne (1957); the two suraminates were found to be effective prophylactics under experimental fly challenge by Desowitz (1957). RD 2902 was described by Watkins and Woolfe (1956) and tested in cattle by Robson and Milne (1957).

Materials and Methods

(a) *Cattle*

Immature Tanganyika Zebu bulls were brought from places where there was little chance of their having been in contact with tsetse and moved to an area where there was no chance of their becoming infected. They were castrated and held in this place from November 10th, 1956, until February 6th, 1957. Thick blood smears were taken regularly every second day and gland smears on occasions during this period.

The weights of the cattle were estimated on February 1st, 1957, by a skilled cattle buyer and varied from 110 lb. to 320 lb., the average being 170 lb.

After the cattle were moved into tsetse country, thick blood smears were taken from all animals every day except Sundays. From the 55th day onward, a gland smear from each beast was substituted for one of the blood smears each week. Three daily sets of slides were sent to Mpwapwa where they were examined by one author (J.R.), while the remainder were examined at the East African Trypanosomiasis Research Organisation Laboratories, Old Shinyanga. All slides were stained with Giemsa for examination.

All the animals were herded at night in a thorn enclosure and grazed as one herd throughout.

(b) *Locality*

The area where the cattle were exposed to infection was on the edge of Block 9, Old Shinyanga, Tanganyika—5 miles from the East African Trypanosomiasis Research Organisation Laboratory.

(c) *Drugs*

Prothidium* was prepared as a 4 per cent. solution in boiling water.

Ethidium suraminate was prepared by mixing aqueous solutions of ethidium bromide* and suramin B.P.† in the theoretical proportion of 6 molecules of ethidium to one molecule of suramin (Williamson & Desowitz, 1956). Unfortunately, it has come to light since the commencement of the experiment that suramin is hygroscopic and that the batch used contained some 20 per cent. moisture. Therefore, the suspension of the suraminate used in this experiment contained some 20 per cent. uncombined ethidium. The suspension was made up to contain 50 mg. ethidium in 1 ml. suspension.

The RD 2902 suraminate was prepared in the proportion of 1.0 gramme RD 2902 chloride* to 0.82 suramin B.P. (Woolfe, 1956). The remarks concerning the moisture in the suramin, as described in the preparation of ethidium suraminate, also apply here. The final suspension contained 50 mg. RD 2902 in 1 ml. suspension.

The dosage rates of both the suraminates throughout this paper refer to the amount of ethidium or RD 2902 present in the suspension, and *not* to the total amount of the suspension.

The antrycide prosalt† was prepared by the manufacturer's recommended method.

All the drugs were prepared the day before they were used and stored in a refrigerator overnight.

All inoculations were given subcutaneously into the dewlap just anterior to the sternum.

Berenil‡ prepared as a 7 per cent. aqueous solution, and ethidium bromide, as a 2.5 per cent. solution, were used to treat "break-throughs."

(d) *Design*

The cattle were all numbered with ear-tags, separated into light and dark coloured animals, and then randomised into groups as shown in Table I (overleaf).

All the cattle, except the controls, were treated on February 3rd, 1957. On February 6th, 1957, all were moved to tsetse-infested country where they remained until they were retired or died. In the results all days are counted from February 7th, 1957 (Day 1), the day the cattle were first exposed to tsetse.

On the 7th of each following month (Days 29, 60, 90, 121, and 151) 6 uninfected cattle, to act as controls, were introduced into the main herd.

On days 56 and 117 the remaining uninfected cattle in the antrycide prosalt group were retreated with antrycide prosalt at 11.7 mg. per kg.

(e) *Tsetse and Estimation of Challenge*

The tsetse found in the experimental areas were *Glossina swynnertoni* and *G. pallidipes*.

Two methods were used for estimating challenge:—

(i) Tsetse catches on fly-rounds by fly-boys to give an index of challenge; and

(ii) Tsetse catches on cattle to give an estimate of challenge.

These will be fully described in another paper, but a summary of the findings follows.

The cattle were grazed on the bush edge for a

* Messrs. Boots Pure Drug Co. Ltd.
† Imperial Chemicals (Pharmaceuticals) Ltd.
‡ Farbwerke Hoechstag Ag.

TABLE I

SHOWING THE DESIGN OF THE EXPERIMENT AND THE TIME DISTRIBUTION OF BREAK-THROUGHS AND DEATHS IN THE TREATED GROUPS

Drug	Dosage rate mg. per kg.	Colour of animal	Number of animals in group at entry	Number of break-throughs	Period in days to first positive slide	Period in days from entry to removal of group	Number of negatives at removal of group	Period in days to death (D) or retiral (R)
Prothidium	2	Light	7	5	47, 64, 80, 82, 86	108	2	—
		Dark	7	6	82, 82, 93, 103, 105, 108	108	1	—
	4	Light	7	5	120, 127, 141, 143, 161	174	1	31(D)
		Dark	7	5	110, 120, 122, 135, 155	174	2	—
Ethidium Suraminate	5	Light	7	5	113, 133, 135, 135, 143	174	2	—
		Dark	7	4	118, 135, 140, 164	174	3	—
	10	Light	7	2	135, 171	174	3	13(D) 112(R)
		Dark	7	3	120, 132 141	174	4	—
RD 2902 Suraminate	10	Light	7	—	—	108	7	—
		Dark	7	2	96, 98	108	5	—
	20	Light	7	—	—	108	5	48(D) 54(D)
		Dark	7	—	—	108	6	76(D), 116 (D), 134(D)*
Antrycide Prosalt (repeated)	11·7	Light	14	5	31, 55, 56, 56, 91	174	9	—
		Dark	14	7	56, 56, 56, 57, 110, 118, 159	174	5	10(R) 137(D)
Initial Controls	Nil	Light	5					
		Dark	5					

* Two animals in this group died after the group was removed from the exposure area (Day 108).

mean period of 5.49 hours per day. The remainder of the time per day was spent in the crush, and travelling to and from water and the bush edge.

During the period of the trial, the mean apparent density, *i.e.* the number of non-teneral male tsetse per 10,000 yards of fly-round, on the bush edge was 177 *G. swynnertoni* and 34 *G. pallidipes*. The apparent density drops rapidly as the distance from the bush edge increases, *e.g.* at the bush edge the apparent density of *G. swynnertoni* was 177 while 200 yards out it was only 6.2. Therefore the cattle were exposed to a much smaller challenge when they were not actually on the bush edge.

The infection rate of *G. swynnertoni* was 2.44 per cent. and that of *G. pallidipes* 3.05 per cent., thus giving an index of challenge by *G. swynnertoni* of 432 and of *G. pallidipes* of 103. This index of challenge is the apparent density multiplied by the infection rate of dissected flies, and not that used by Whiteside, who multiplies the total catch of non-teneral male *and* female tsetse by the infection rate (Whiteside, 1957).

An estimation of challenge was calculated and it was found that each animal should have received 0.071 infected tsetse feeding per day over the last 4 months of the trial.

Results

Throughout the trial there was no significant difference between light and dark coloured animals over the whole experiment, nor for any particular treatment. Consequently, for all other comparisons, in

so far as this experiment is concerned, colours can be combined into a single group.

It was agreed to take, arbitrarily, the average number of days from exposure to the first positive slide of the first 5 animals in each group to "break through," in order to be able to make a comparison of the value of the drugs used.

The results of each treated group and the controls are considered separately. *T. congolense, T. vivax,* and *T. brucei* group were identified at various times in both the control and treated groups.

Table I shows the time distribution of "break-throughs" in respect of all treatments.

Control Groups

Throughout the experiment every control animal in every group became positive eventually.

Ten untreated animals, as controls, were introduced with the treated cattle into tsetse bush on February 7th, 1957 (Day 1). The mean period from entry to the first positive slide was 28 days, varying from 26 to 31 days. Three animals in this group were allowed to die and they all died showing typical signs of acute trypanosomiasis.

On Day 29, 6 more uninfected untreated animals were introduced; likewise on Days 60, 90, 121, and 151. The results of these controls are shown in Table II.

TABLE II

SHOWING THE RESULTS OF EXPOSURE OF CONTROL ANIMALS TO TSETSE, EVERY ANIMAL BECOMING INFECTED

Day of entry into fly	No. of animals in group	Mean period in days to first positive slide	No. of animals allowed to die	No. of days from first positive slide to death
1	10	28·00	3	18, 59, 67
29	6	21·83	1	14
60	6	19·33	1	32
90	6	24·16	1	137
121	6	21·16	1	118
151	6	26·16	1 (1 killed by lion)	103
Totals and means	40	23·90	8	68·5

The earliest positive slide from the control animals was obtained after 12 days' exposure to fly and the longest period from exposure to first positive slide was 69 days. Both of these occurred in the group introduced on Day 151.

The mean period from exposure to first positive slide for all animals in the control groups was 23.90 days, and there was no significant difference between any of the 6 groups. The mean period from the first positive slide to death was 68.5 days.

Prothidium Groups

(a) *Dosage rate 2 mg. per kg.* The group was retired on Day 108 by which time 11 of the 14 animals had shown positive slides: the first on Day 47, the last on Day 108.

The average number of days from exposure to the first positive slide for this group was 71 days. This does not, however, give a true picture of the value of the drug as a prophylactic.

(b) *Dosage rate 4 mg. per kg.* On Day 174 the group was retired when 11 animals had shown positive blood slides, the first on Day 110 and the last on Day 161.

Three animals had not shown trypanosomes in blood or gland smears at the end of the experiment, Day 174.

The average number of days from initial exposure to first positive slide for the first 5 animals to "break through" in this group was 120 days.

Ethidium Suraminate Groups

(a) *Dosage rate 5 mg. per kg.* In this group 9 animals became positive in the course of the experiment and 5 remained uninfected when the experiment ended (Day 174). The first "break-through" occurred on Day 113 and the last on Day 164.

The mean period from exposure to "break-through" for the first five animals in this group was 127 days.

(b) *Dosage rate 10 mg. per kg.* Five "break-throughs" occurred in this group, the earliest on Day 120 and the last on Day 171.

The mean period to "break-through" for the first 5 animals to become infected in this group was 140 days.

RD 2902 Suraminate Groups

(a) *Dosage rate 10 mg. per kg.* Two "break-throughs" occurred in this group before it was removed from the experiment, Day 108. The first "break-through" was on Day 96 and the second on Day 98. All the other animals remained negative.

(b) *Dosage rate 20 mg. per kg.* In this group no "break-throughs" occurred before it was removed on Day 108 after initial exposure.

No figure for comparative purposes has been worked out for the RD 2902 suraminate groups because of the toxicity shown.

Antrycide Prosalt Group

Dosage rate 11.7 mg. per kg. (Repeated on uninfected animals at 2-monthly intervals.)

A total of 12 "break-throughs" occurred in this group: 8 between initial exposure and first retreatment, 3 between first and second retreatment, and 1 after the second retreatment.

Table III shows the time-distribution of animals infected in this group.

The mean period from exposure to first positive slide for the first 5 animals becoming infected was 51 days.

Local Reactions

Local reactions were classified as severe, moderate, or mild, basing this classification on the size and prominence of the reaction.

TABLE III

SHOWING THE TIME-DISTRIBUTION OF ANIMALS INFECTED IN THE ANTRYCIDE PROSALT GROUP

Period	Total in group	Number of positives	Number of days from treatment or retreatment to breakdown	Number of negatives	Number of deaths or retirals
Initial exposure to first retreatment	28	8	31, 55, 56, 56, 56, 56, 56, 57	19	1 (broken leg)
First retreatment to second retreatment	19	3	35, 54, 62	16	—
Second retreatment to end of experiment (57 days after 2nd retreatment)	13	1	41	11	1 (lion-bite) negative up to death

A severe reaction was one where the swelling exceeded 6 inches in diameter and was very prominent. A moderate reaction was where the swelling was 2 to 6 inches in diameter and not very prominent. A mild reaction was one where the swelling was less than 2 inches in diameter and hardly noticeable to the eye.

The number and severity of the local reactions are shown in Table IV.

The prothidium reactions took the form of a plaque which gradually resolved, leaving the skin over the site of inoculation "puckered" by underlying fibrous adhesions.

The progress of the ethidium suraminate reactions was as follows: At first a hard plaque developed; later, swelling increased at the centre and decreased at the edges until after about one month the swelling was 3 inches in diameter and round. Softening then occurred somewhere on the swelling and a necrotic spot appeared which enlarged to about one inch or more in diameter and ruptured, exuding small amounts of a sticky, pus-like, pink-stained fluid for about 4 days, and then healed without further complication. All attempts to squeeze material from a swelling failed, but in 3 animals a fibrous, pink-stained cord was seen which, though it protruded and could not be removed by pressure, sloughed by the next day, leaving a cavity which healed.

The course of the RD 2902 suraminate reactions was similar but when rupturing of the swelling occurred, it was usually only ½ inch in diameter and sloughing did not occur.

The antrycide prosalt reactions followed the usual course, forming hard fibrous lumps under the skin, about 1½ inches in diameter. These lumps persisted for the duration of the experiment.

TABLE IV

SHOWING THE NUMBER AND SEVERITY OF LOCAL REACTIONS IN TREATED GROUPS

Drug	Dosage rate mg. per kg.	Days After Inoculations: 2 — Type of reaction			9 — Type of reaction			Number of ruptured swellings	Total number of animals in group
		Severe	Mod.	Mild	Severe	Mod.	Mild		
Prothidium	2	1	6	7	2	6	6	—	14
	4	6	2	6	3	8	3	—	14
Ethidium Suraminate	5	2	7	5	10	4	—	12	14
	10	9	3	2	13	1	—	9	14
RD 2902 Suraminate	10	4	7	3	1	9	4	1	14
	20	7	4	3	3	9	2	6	14
Antrycide Prosalt	11·7	—	3	25	—	1	27	—	28

Mod. = Moderate.

Deaths and Toxic Effects

(a) *Prothidium Groups*

(i) *Dosage rate 2 mg. per kg.* No deaths and no signs of toxic effects occurred.

(ii) *Dosage rate 4 mg. per kg.* One animal collapsed and died suddenly in the bleeding crush on Day 31. The *post-mortem* examination only revealed slight congestion of the lungs.

(b) *Ethidium Suraminate Groups*

(i) *Dosage rate 5 mg. per kg.* There were no deaths or any sign of toxic effects in this group.

(ii) *Dosage rate 10 mg. per kg.* One animal died on Day 13 from snake-bite; another was retired from the experiment on Day 112 because it was debilitated and unable to keep up with the herd, and finally died 130 days after its retiral. Both animals were negative up to the time of their deaths. The latter animal showed the following *post-mortem* signs:—

Inoculation site. Previously ruptured. Healed with "puckering" over site. Remains of drug could not be detected, but a nodule was present, encapsulated by thick, fibrous tissue with fibrous septae running throughout it.
Carcase. Emaciated. No signs of fever. Slight subcutaneous and intramuscular oedema. Superficial lymph glands oedematous.
Pleural cavity. Slight excess of fluid. Numerous small patches of lymphoid tissue present.
Lungs. Nothing abnormal noted.
Heart. Pericardial fat oedematous containing well-defined areas of lymphoid tissue. Slight excess pericardial fluid. Extensive epicardial petechiation particularly round coronary bands. Muscle flabby.
Peritoneal cavity. Abdominal fat oedematous. Mesenteric glands oedematous.
Spleen. Subcapsular haemorrhages.
Other organs. Nothing abnormal noted.
Slides. All negative.

(c) *RD 2902 Suraminate Groups*

(i) *Dosage rate 10 mg. per kg.* No deaths occurred in this group but the condition of some of the animals gradually deteriorated until, at Day 50, one animal was in very poor condition indeed and remained so until the group was removed, and several were in poor condition, but gradually improved until removed with the group on Day 108. Because of the loss in condition in cattle, which it was thought was caused by the drug, it was decided to remove the group at Day 108 to prevent unnecessary losses of cattle.

(ii) *Dosage rate 20 mg. per kg.* A total of 5 animals died, the first on Day 48 and the fifth on Day 134.

The history and *post-mortem* examination of the one that died on Day 48 is given below.

The animal gradually became debilitated and became progressively more so for a period of 2 weeks prior to death. Finally, anorexia set in and the animal collapsed and died.

Inoculation site. Original inoculation 27.0 ml. Approximately 5.0 ml. of the drug remained, being of somewhat dry consistency but of the same colour as it was at the time of inoculation. This drug was encased in a thin, fibrous capsule.
Condition. Extremely emaciated, coat staring.
Pleural cavity. Nothing abnormal noted.
Heart. Nothing abnormal noted.
Peritoneal cavity. Several filarid worms present.
Omentum. Diffusely inflamed.
Abomasum. Marked diffuse inflammation.
Small intestine. Diffuse inflammation.
Liver. Markedly reduced in size to about one-third normal, fibrous and purple in colour. The reduction in size was so marked that it was probably very small initially.
Kidneys. Nothing abnormal noted.
Bladder. Diffuse inflammation of the epithelium.
Urine. Dark and cloudy.
Brain. Slight inflammation of the meninges.
Slides. All negative.

At this time (Day 50) a thorough examination of all animals in this group revealed that 4 were in very poor condition and 2 more in poor condition.

Of the 4 other animals which died, the following is a composite *post-mortem* examination (where there are figures in brackets, these refer to numbers of individual animals):—

Inoculation site. Drug present but drier than at inoculation; cords of fibrous tissue penetrating into intramuscular connective tissue, some of the cords containing the drug.
Condition. Very emaciated, little or no body, renal or cardiac fat.
Pleural cavity. Slight excess of fluid.
Heart. Oedematous areas along lines of cardiac vessels —pale and flabby.
Lungs. Oedematous and congested.
Trachea and bronchi. Considerable amount of white froth present (1).
Peritoneal cavity. Slight excess of fluid.
Liver. Reduced in size and very hard (2). Fatty degeneration (1).
Slides. All negative.

(d) *Antrycide Prosalt Group*

Dosage rate 11.7 mg. per kg. (Repeated on uninfected animals at 2-monthly intervals.)

One animal was retired on Day 10 with a broken leg and another was killed by a lion on Day 137. Both were negative until death.

Treatment of Infected Animals

Berenil, at a dosage rate of 3.5 mg. per kg., was used to treat "break-throughs" in the protected groups after the individuals were retired from the experiment, and ethidium bromide, at a dosage rate of 1.0 mg. per kg., was used to treat those controls which became infected and were not allowed to die.

Both drugs appeared to be effective, but treated animals were only examined for a short period (14 days) after treatment.

Discussion

Previous experiments with prothidium and the suraminates of ethidium and RD 2902 have, with one exception, been carried out using either "syringe" challenge (Robson & Milne, 1957) or experimental fly challenge (Williamson & Desowitz, 1956; Desowitz, 1957). The one exception is the series of experiments carried out by the Kenya Veterinary Department (Kenya Government, 1957) who state that prothidium at 2 mg. and 4 mg. per kg. protected Zebu cattle for more than 6 months under heavy challenge. Heavy challenge is defined by them as a total catch of over 50 non-teneral males and females *G. pallidipes* per 10,000 yards of fly-round.

In the trial now reported, cattle treated prophylactically with these drugs were subjected to a very heavy natural challenge; in fact the estimate of challenge proved to be so heavy that one would not normally consider keeping cattle in such an area, but in spite of this, fairly long protective periods were obtained with some of the drugs.

In order to be able to make a comparison of the drugs used, it was decided, arbitrarily, to take the mean period from exposure to first positive slide of the first 5 animals to "break through" in any group.

From a study of these figures it can be seen that, although ethidium suraminate at 5 mg. and 10 mg. per kg. was apparently slightly better than prothidium at 4 mg. per kg., the local reactions caused by ethidium suraminate were so much more severe as almost to preclude its use as a practical field prophylactic at the moment. One inoculation of prothidium used at a dosage rate of 2 mg. per kg. was apparently slightly better than one inoculation of antrycide prosalt at 11.7 mg. per kg.

The suraminate of RD 2902 at 10 mg. and 20 mg. per kg. appeared, under the conditions of this experiment, to be too toxic to use at these levels; 5 deaths occurred out of 14 animals in the group treated with 20 mg. per kg., and several animals became emaciated in the group treated with 10 mg. per kg. Both groups were removed from exposure to tsetse 108 days after initial exposure and sold to prevent unnecessary losses from deaths. Although toxic, it was effective as a prophylactic.

One animal in the prothidium group 4 mg. per kg. died and this death may have been due to toxicity, but the absence of marked *post-mortem* lesions makes this question difficult to decide. It was thought that one animal in the group given 10 mg. per kg. ethidium suraminate died owing to the toxic effects of the drug.

Under the conditions of challenge in this experiment antrycide prosalt used at 2-monthly intervals did not give complete protection.

It is interesting to note that the percentage of "break-throughs" for each retreatment of antrycide prosalt decreased. This may be due to the fact that, with the increasing number of "depot" sites, the blood level of the drug is better maintained. It might also depend on the natural resistance to trypanosomiasis of individual beasts. It is thought more likely to be a combination of both factors.

It has been thought that the colour of animals may be a factor in challenge, because differential attractiveness to tsetse might cause animals to be subject to varying trypanosome challenge in similar conditions of fly. This was not borne out in this trial because there was no significant difference between light and dark coloured cattle over the whole experiment, nor was there any significant difference between light and dark animals for any particular treatment.

Acknowledgments.—We wish to thank Messrs. Boots Pure Drug Co. Ltd. who supplied the cattle, the prothidium, and the RD 2902 for the trial, and Dr. G. Woolfe, of that Company, for all his assistance.

Our thanks are also due to B. L. Griffith, Laboratory Technician; J. F. F. Callear, M.R.C.V.S., who assisted with the *post-mortem* examinations; R. M. Arnold, B.SC., M.R.C.V.S., Chief Veterinary Research Officer, Tanganyika; Dr. K. C. Willett, M.A., M.B., B.S., and I. M. Smith, M.SC., M.R.C.V.S., both of East African Trypanosomiasis Research Organisation, who assisted in planning the trial.

Finally, the Director of Veterinary Services, Tanganyika Territory, and the Director, East African Trypanosomiasis Research Organisation, are thanked for the facilities provided and for permission to publish the results.

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PROFESSIONAL ADVERTISEMENTS

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SLAUGHTERHOUSES

The following letter is quoted from the *Liverpool Echo*:—

Following a recent report in the *Echo* dealing with the presidential address of Mr. J. M. Ingram, of Oxted (Surrey), to the annual congress of the British Veterinary Association, my committee discussed the report at some length, and were in complete accord with Mr. Ingram's remarks.

The following resolution was then adopted:—

That the Lancashire County Committee of the National Union of Agricultural Workers, strongly condemns the action of the Government in freeing licences of slaughterhouses. We are of the confirmed opinion that if the consuming public are to be fully protected by having all meat inspected at slaughterhouses, then the answer is to withdraw all private slaughterhouse licences, and to make it illegal for any animal to be slaughtered anywhere, other than in a public slaughterhouse.—*TOM CROSS, Secretary, Lancashire County Committee, National Union of Agricultural Workers.*

SUGGESTED SCHOOL FOR SHEPHERDS

Britain should follow the example of France in having training schools for shepherds, Mr. William Lyle Stewart, former lecturer at King's College, Durham University, told farmers at Skipton recently. There was to-day a reawakening of interest in sheep farming and farmers needed reliable and well-trained shepherds. Shepherding, he said, could not be learned in six easy lessons by post.

In France, where sheep were less important economically, a sheep school was established 150 years ago. It had been very successful in turning out many capable shepherds for whose services there was considerable demand. Mr. Lyle Stewart suggested we could profitably copy the Frenchmen and set up some organisation on which flockmasters could rely for well-trained, reliable shepherds.

Inclusion-body Rhinitis of Swine Nasal Scrapings as an Aid to Diagnosis

BY
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SUMMARY.—Scrapings from the nasal mucosa stained by Giemsa or methylene blue are a useful aid to the diagnosis of inclusion-body rhinitis of swine.

An illustrated description is given of the morphology of the characteristic inclusion-bearing cells (IBR cells) as seen in scrapings.

Diagnosis on nasal scrapings is only applicable to pigs in the early stages of the clinical disease since IBR cells are not found after about a fortnight.

Within this limitation nasal scrapings are comparable in accuracy with paraffin sections of the turbinates, and have the advantage that they may readily be made under field conditions.

SINCE inclusion-body rhinitis of pigs was first described (Done, 1955) it has become clear that the condition is widely distributed in Britain and is a significant cause of clinical disease in young pigs.

It appears to be the principal cause of acute catarrhal rhinitis in pigs at the present time and is to be suspected whenever an apparently infectious type of "snuffles" or "cold" is seen in suckling pigs or those recently weaned.

In the field the syndrome is fairly easily recognised by the experienced clinician when it is present in its typical form, but the demonstration of the pathognomonic inclusion-bearing gland and duct cells (called by us IBR cells) in the nasal mucosa is helpful in confirming a diagnosis or establishing one in less straightforward cases.

IBR cells are present in the nasal mucosa of infected pigs in the acute phase of the disease and, in general, their numbers vary directly with the severity of the clinical disease. When present, they can easily be seen in decalcified paraffin sections of the turbinates stained by haematoxylin and eosin, but these are relatively too costly and time-consuming to prepare to be of widespread use as a routine aid to diagnosis.

In order to examine as large a section of nasal mucosa as possible without the trouble of decalcifying, the writer has used the following technique. After removal of the ventral turbinates the mucosa remaining in the nasal cavity is fixed *in situ* by immersion in 10 per cent. formol saline. Then, starting laterally at the line of attachment of the turbinates the mucous membrane is stripped off from the underlying bone and cartilage to give a sheet which is then folded double, rolled lengthwise and secured in this form by a strand of cotton. This roll of tissue is embedded on end and cut from the folded end to give a section in which the nasal mucosa appears as a double spiral.

However, even this technique demands more laboratory assistance than is usually available to the general practitioner and for the latter we recommend nasal scrapings as a useful aid to the diagnosis of inclusion-body rhinitis of pigs in the field.

Method of Making Nasal Scrapings

Scrapings from the nasal mucosa may be made from either living or dead pigs. While it may be necessary to attempt to establish a diagnosis on scrapings from a live pig, material from a dead one is usually easier to obtain and more satisfactory for examination. Furthermore, in the event of a serious outbreak of disease only rarely will a dead pig or a badly affected one not be available for necropsy.

In order to pick out the more severely affected piglets for closer examination, the author has the pigman move the piglets round the pen gently but continuously for some 20 minutes. Every time a pig sneezes it is marked with a paint stick, so that after some time it is usually easy to identify the worst sneezers by the number of coloured stripes.

It will be appreciated that the cells required for examination are the serous gland cells lying in the propria and the duct epithelium cells, and that their removal from the nose of the living animal will be accompanied by a certain amount of bleeding. Though this is sometimes spectacular it is usually transient and seems to cause less inconvenience to the pig than to the operator.

Material is collected by the insertion of either a blunt spoon (Volkmann's double-ended spoon, 15 c.m. long, is suitable) or a sterile swab into the nasal cavity between the ventral turbinates and the nasal septum, the instrument being directed obliquely towards the mid line while being introduced and withdrawn. A feature of the nasal cavity of the normal pig is the paucity of unoccupied space, so that little difficulty is experienced in making contact with the mucosa and obtaining scrapings. Heavy contamination of the scrapings by blood should be avoided since it makes examination of the resultant smears more difficult.

In the dead animal the procedure is much more simple; a transverse cut through the snout at the level of the second premolar permits free access to the nasal cavity and allows the operator to assess the condition of the nasal mucosa and also the degree of development or atrophy of the turbinates. The ventral turbinates are removed (with curved round-ended scissors) along the line of their attachment to the lateral wall, and, after freeing them from pus and mucus with a pledget of cotton-wool, scrapings are made from the deeper layers of the mucosa with a scalpel blade held vertical to the surface. These scrapings are spread thinly on clean

3-inch x 1-inch slides using the flat of the scalpel blade. Scrapings from several different sites can be spread on each slide, this being preferable to making smears covering the whole slide from a single scraping.

Scrapings should be fixed as soon as possible, preferably by absolute methyl alcohol; unless staining can be carried out immediately fixation time should be prolonged.

Fixation and Staining

Relatively simple methods are quite adequate for diagnostic purposes and there is little to be gained by using more complicated techniques. In our hands and under field conditions the Papanicolaou techniques (Papanicolaou, 1954) and the Shorr-Foot (Foot, 1945) modification have not proved very satisfactory and we suggest the following methods for general use.

I. *Methylene Blue.*

Fix by gentle heat.

Flood slide with 1 per cent. aqueous methylene blue for ½ to 1 minute.

Rinse quickly, blot dry and examine.

II. *Giemsa.*

Fix in absolute methyl alcohol for 3 minutes and allow to dry.

Invert onto 1:10 Giemsa in distilled water for 10 minutes, or 1:20 Giemsa in distilled water for 2 to 4 hours, or 1:40 Giemsa in distilled water overnight. (Cover staining dishes for the longer periods).

Rinse in alkaline tap water and allow to dry.

III. *Leishman-Giemsa.*

This method is slightly more trouble than the preceding two but is capable of beautiful results.

Cover smear with undiluted Leishman's stain—30 seconds.

Add an equal quantity of distilled water, mix and allow to stain for 10 minutes.

Rinse briefly in distilled water.

Invert on to (or immerse in a staining jar of) Giemsa's stain 1:20 for 2 to 4 hours or 1:40 overnight.

Differentiate in alkaline tap water. Allow to dry.

Examination of the Smear

Microscope lens combinations giving magnifications of about 100 and 250 diameters are suitable for examining the stained smears and as these objectives will usually be dry it is recommended that smears be either permanently mounted or covered temporarily using immersion oil between slide and coverslip.

Recognition of IBR Cells

With regard to size, no absolute criterion will be given for IBR cells in nasal scrapings since their size and the relative prominence of their component parts vary with the fixative and stain used, but affected gland cells stand out clearly by comparison with normal cells in the same smear and can be identified by the following features, most of which will be recognised if several suspicious cells in the same smear are examined under a higher magnification.

(a) Nucleus is usually at least twice the diameter of nuclei of normal cells in the same field.

(b) Nucleus stains heavily and under high powers can be seen to be granular.

(c) Nuclear membrane is visible in at least part of its periphery separated from the central darkly staining intranuclear mass.

(d) Peripheral nuclear bodies (staining blue by all 3 methods) may be found between the nuclear membrane and the central intranuclear mass.

(e) Cytoplasm (in unruptured cells) is much more copious than in normal cells.

(f) Intracytoplasmic inclusions are present in unruptured cells, usually arranged in a crescent at the free border of the gland cell (*i.e.*, opposite pole of the cell to the nucleus). These stain deep magenta by the Romanowsky stains and light blue with methylene blue. Sometimes the methylene blue stained smears do not show typical intra-cytoplasmic inclusions but the cytoplasm contains metachromatic (pinkish purple) material more diffusely distributed. The principal distinguishing features of IBR cells are depicted semi-diagrammatically in Figure 1.

Interpretation

The positive identification of one or more IBR cells in scrapings from the nasal mucosa definitely establishes the existence of the disease. On the other hand failure to find the characteristic cells does not rule out the possibility that the animal was initially infected with inclusion-body rhinitis, since IBR cells are normally present only in conjunction with the early phases of the clinical disease.

IBR cells usually appear some 10 to 14 days after exposure to infection and slightly precede the onset of clinically obvious rhinitis. Thereafter they can generally be found, except in very mild cases, for about the next fortnight during which time healing and repair are progressing, until all the affected gland cells have disintegrated.

It will be seen, therefore, that in arriving at a diagnosis on a herd basis (and it is the author's contention that it should be so based) it may be better to ignore the animals which were reported to have been attacked first and concentrate on those more recently affected and thus more likely to yield diagnostically conclusive evidence.

A good nasal scraping will contain gland cells roughly equal in number to those seen in a single transverse section of the ventral turbinate so that its accuracy in identifying the presence of IBR cells is broadly comparable with conventional histological methods, but, unless the operator has a very considerable amount of experience, exfoliative cytology cannot be expected to give as much information regarding cases in which there are no IBR cells to be seen.

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J. T. DONE—INCLUSION-BODY RHINITIS OF SWINE NASAL SCRAPINGS AS AN AID TO DIAGNOSIS

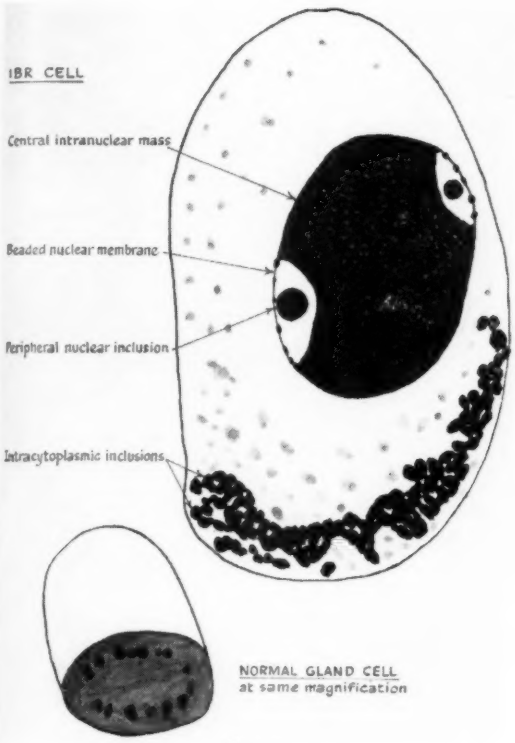


FIG. 1.—Semidiagrammatic representation of IBR cell, as seen in Giemsa-stained nasal scraping.

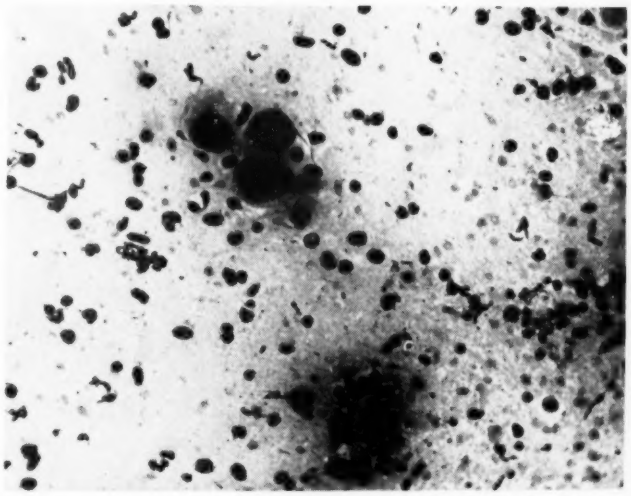
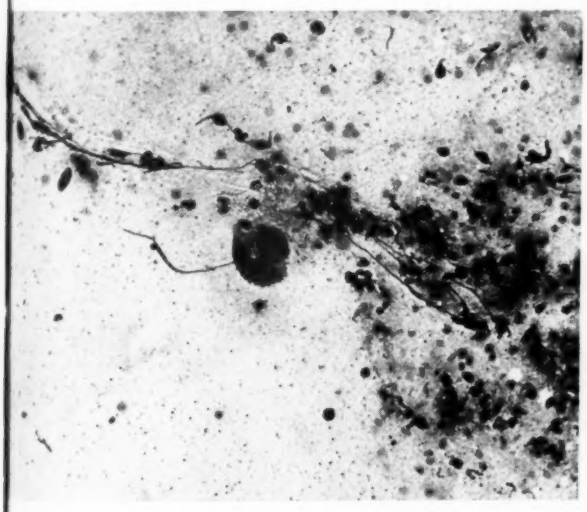


FIG. 3.—PD3058. Nasal scraping, stained Giemsa × 230 approx. The three large IBR cells in the centre of the field are clearly differentiable on grounds of size alone from the group of normal gland cells at the lower border.



2.—PD2823. Nasal scraping, stained Leishman-Giemsa × 230 ox. There is a single IBR cell with typical cytoplasmic inclusions in the centre of the field.

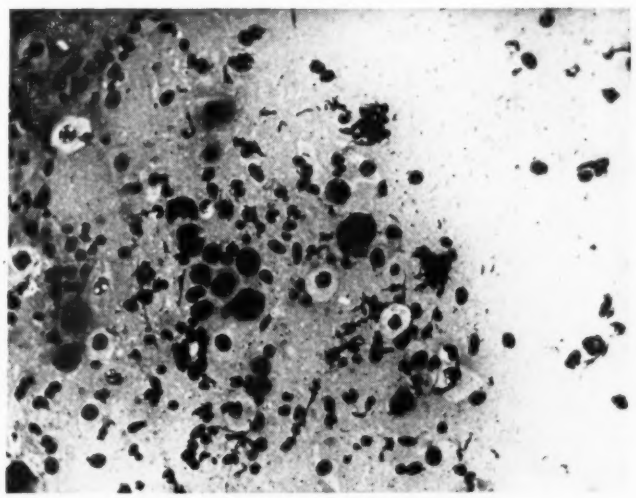


FIG. 4.—PD3059. Nasal scraping, stained Giemsa × 230 approx. A number of IBR cells of different sizes are in the centre of the field: the separation of the central intranuclear mass from the nuclear membrane can be seen in some. The angular cells with pale cytoplasm are squamous cells suggesting epithelial metaplasia.

Delegates and guests at the 1958 Congress in Douglas, Isle of Man

Copies of this photograph may be obtained direct from the photographers, *Messrs. Manx Press Pictures, 26, Prospect Hill, Douglas, Isle of Man, price 7s. 6d. each.*

THE CONGRESS ATTENDANCE LIST

Mr. S. G. Abbott, Mr. C. G. Allen, Mr. J. A. Anderson, Mr. & Mrs. T. S. Anderson, Miss W. E. Armitage, Mr. P. K. C. Austwick, Dr. R. J. Avery, Mr. & Mrs. F. C. D. Back, Mr. F. C. Baker, Mr. A. Bandaranayake, Mr. D. S. Barbour, Mr. P. D. Baylis, Mr. B. R. Bee, Mr. & Mrs. R. B. Beer, Mr. & Mrs. C. H. Bell, Mr. F. Bennett, Mr. N. Berry, Mr. C. G. L. Beveridge, Mr. & Mrs. A. G. Beynon, Mr. J. A. F. Billings, Mr. P. Bishop, Mr. N. M. Black, Mr. P. S. Bligh, Dr. & Mrs. D. A. Boardman, Mr. & Mrs. S. Bootland, Mr. D. Boyce, Mr. R. P. Boyd, Mr. & Mrs. C. Boyde, Mr. & Mrs. J. G. S. Boyle, Mr. & Mrs. A. L. Bragg, Mr. G. C. Brander, Mr. N. H. Brooksbank, Mr. & Mrs. C. K. Brown, Mr. & Mrs. F. G. Brown, Mr. J. W. Bruford, Dr. A. Buxton, Mr. & Mrs. H. E. Bywater, Mr. J. E. C. Bywater, Mr. & Mrs. E. R. Callender, Mr. & Mrs. G. R. Carter, Mr. & Mrs. R. W. Cassells, Mr. J. Chapman, Dr. K. S. Chodnik, Dr. H. P. Chu, Mr. R. H. Clover, Dr. W. Ross Cockrill, Mr. & Mrs. V. Cole, Mr. N. Comben, Mr. E. Conn, Mr. & Mrs. J. P. Cook, Mr. B. S. Cooper, Mr. & Mrs. E. Corrigall, Mr. J. S. M. Cosgrove, Mr. J. S. Cosgrove, Dr. & Mrs. E. Cotchin, Col. L. W. Coulden, Mr. H. Coulthard, Mr. M. Crawford, Mr. & Mrs. H. Cremlyn-Hughes, Mr. G. H. Creyke, Mr. D. R. V. Crichton, Mr. & Mrs. P. E. Curtis, Mr. J. A. Dall, Sir Thomas Dalling, Lt.-Col. G. T. Dalziel, Mr. E. T. Davies, Dr. & Mrs. G. O. Davies, Mr. M. Davis, Mr. C. V. Dayus, Mr. & Mrs. T. C. Denholm, Mr. I. Dickson, Mr. J. Donald, Mr. H. Edwards, Mr. N. Edwards, Mr. J. K. S. Elmslie, Mr. E. Elston, Mr. R. English, Mr. F. A. Espley, Mr. J. T. R. Evans, Mr. P. Eyre, Mr. & Mrs. C. M. Ferguson, Mr. & Mrs. H. I. Field and Mr. R. S. Field, Mr. R. M. Findlay, Mr. & Mrs. J. T. T. Finlay, Mr. R. C. U. Fisher, Dr. & Mrs. A. C. Fraser, Mr. W. W. C. Gibson, Mr. & Mrs. W. S. Gimber, Mr. Glade-Wright, Dr. M. V. H. Glaettli, Mrs. D. I. Glover, Mr. J. Gourley, Mr. & Mrs. O. Graham-Jones, Mr. & Mrs. F. Grant, Mr. & Mrs. W. Grant, Mr. & Mrs. H. C. H. Gray, Mr. L. Greggain, Mr. T. Groves, Councillor W. Groves, Mr. M. Harkness, Mr. W. T. Harrow, Mr. R. H. Hawkins, Mr. & Mrs. G. B. S. Heath, Mr. & Mrs. H. F. Hebeler, Miss H. E. Hein, Mr. G. N. Henderson, Mrs. C. Hennessy, Mr. S. L. Hignett, Dr. & Mrs. J. R. Holmes, Mr. & Mrs. H. Holroyd, Mr. & Mrs. J. R. Holt, Mr. W. R. Horn, Dr. & Mrs. E. H. Houchin, Dr. D. G. Howell, Mr. & Mrs. T. W. T. Howie, Mr. J. H. M. Hughes, Professor D. L. Hughes, Mr. L. E. Hughes, Mr. A. E. Hunter, Mr. T. T. Hunter, Mr. & Mrs. W. K. Hunter, Mr. & Mrs. N. St. G. Hyslop, Mr. Iladenko, Miss D. H. J. Ingram, Mr. J. F. W. Ingram, Mr. & Mrs. J. M. Ingram, Mr. M. Irfan, Mr. E. Jack, Mr. & Mrs. S. Jennings, Mr. H. M. John, Mr. & Mrs. J. B. Johnston, Mr. B. V. Jones, Dr. F. T. W. Jordan, Miss J. O. Joshua, Dr. G. J. Kane, Mr. S. A. Keeble, Mrs. K. G. R. Kelly, Professor & Mrs. W. R. Kelly, Mr. & Mrs. D. W. Kerruish, Major J. N. Kidd, Mr. & Mrs. D. Laird, Dr. M. C. Lambrechts, Mr. K. S. Lee, Mr. T. A. Leppard, Mr. E. W. Little, Mr. & Mrs. H. G. Lloyd, Messrs. F. & K. Lloyd, Mr. H. B. Lomas, Councillor & Mrs. T. Lomas, Mr. & Mrs. G. S. Long, Mr. & Mrs. J. M. S. Lucas, Dr. D. Luke, Mr. W. D. J. McCartney, Mr. G. H. Macdonald, Mr. & Mrs. J. M. McKellar, Miss McKellar, Mr. & Mrs. A. McLean, Mr. W. J. Macleod, Mr. R. Macnab, Mr. R. T. McQueen, Mr. B. McShane, Mr. D. Madden, Mr. and Mrs. D. Reid Marshall, Mr. & Mrs. E. G. Marshall, Mr. D. W. Menzies, Mr. D. T. Michael, Mr. & Mrs. G. N. Mills, Mr. E. H. Morgan, Professor I. Mosgov, Mr. J. A. Moss, Mrs. D. L. Motton, Mr. & Mrs. A. L. Mullen, Mr. I. B. Munro, Miss A. Newnham, Mr. G. C. Nicholson, Mr. J. D. P. O'Brien, Mr. J. H. Ockey, Mr. J. M. Olivant, Mr. & Mrs. D. F. Oliver, Mr. D. E. Orr, Mr. C. G. Parmenter, Dr. A. R. Paterson, Mr. C. W. Pembrey, Mr. & Mrs. R. Pigott, Mr. E. M. Pittaway, Mr. J. Plenderleith, Capt. & Mrs. C. J. Price, Mr. F. J. Proctor, Mr. R. J. Pugh, Mr. M. J. Pullen, Mr. D. I. Railton, Mr. W. E. Rawlinson, Mr. & Mrs. J. N. Ritchie, Mr. H. E. Roberts, Mr. D. P. Roberton, Mr. L. F. Robertson, Mr. & Mrs. R. R. Robertson, Dr. J. M. Ross and Miss J. M. Ross,

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Current Literature

ABSTRACTS

The Epidemiology of Q Fever in Great Britain. MARMION, B. P., & STOKER, M. G. P. (1958). *Brit. med. J.* October 4th, 1958. 809-16.

A survey of the literature of Q fever draws attention to the remarkable diversity of the ecology of *Rickettsia burneti*. Its pattern of maintenance in animal or insect hosts differs strikingly from one part of the world to another and the particular variant which has evolved may have much significance for the infection of man. Thus the infection of sheep in the central valley of California or in Southern Europe is accompanied by an appreciable morbidity among the human beings in contact, whereas the presence of the organism in the rabbits and ticks of the Nefifik forest, Casablanca, is an inapparent infection of seemingly little consequence to the many visitors to this area.

The investigation of Q fever in England started in 1949 when one of the authors (Stoker) found serological evidence of infection in 2 patients with pneumonia. Since then investigations have shown that the disease is widespread in Great Britain.

Attention was concentrated on Kent and East Anglia--areas of high and low prevalence of the disease. Systematic surveys of possible animal reservoirs of Q fever in these 2 areas were undertaken and 3 main epidemiological investigations were carried out.

In the first of these the epidemiological histories of blood donors with Q fever antibody who were living in Kent or East Anglia were compared with the histories of randomly selected and negative donors living in the same areas.

In the second a comparison was made between the prevalence of Q fever in a sheep-raising area, the Romney Marsh, and in a geographically similar area of Fenland with few sheep.

In the third the residents of 2 towns in north-east Kent were studied to determine the part played by cows' milk as a vehicle of Q fever infection. About

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Congress Attendance List—*Concluded.*

Mr. & Mrs. R. F. Ross, Mr. W. H. Russell, Dr. R. Scarisbrick, Mr. & Mrs. W. Scott, Mr. R. Scoular, Mr. R. M. Shires, Col. G. Short, Mr. & Mrs. A. C. Shuttleworth, Mr. & Mrs. J. N. Simpson, Dr. K. B. Sinclair, Mr. B. J. Skeeles, Mr. G. F. Smith, Mr. I. M. Smith, Capt. D. J. Spark, Mr. M. Spaull, Mr. & Mrs. J. D. Spencer, Mr. A. Spreull, Dr. A. Stableforth, Mr. & Mrs. D. T. Stanhope, Mr. A. Steele-Bodger, Mr. & Mrs. C. Stevens, Mr. & Mrs. T. Stewart, Mr. & Mrs. G. B. Stubbs, Mr. B. Studley, Mr. H. Sumner, Mr. R. Swaby, Mr. P. G. Taylor, Mr. & Mrs. A. Thomson (Beckenham), Mr. & Mrs. A. Thomson (Glasgow), Mr. H. Thornton, Mr. & Mrs. L. N. Thornton, Miss S. Trostyanetskaya, Mr. G. Tullis, Mr. & Mrs. E. A. Tutton, Mr. W. Tweed, Miss O. Uvarov, Professor J. H. J. Van Gils, Mr. A. Vogelnest, Mr. J. F. Waller, Dr. & Mrs. J. K. Walley, Mr. W. Walter, Mr. L. J. Ward, Mr. D. K. Watkins, Mr. I. Watt, Mr. & Mrs. C. Weighton, Professor & Mrs. E. G. White, Major J. H. Wilkins, Mr. & Mrs. E. Wilkinson, Mr. A. Wilson, Mr. G. A. Wilson, Mr. J. C. Wood, Mr. K. H. B. Wood, Mr. & Mrs. W. H. Wood, Dr. W. R. Wooldridge, Mr. L. Wootton, Mr. A. J. Wright, Professor and Mrs. J. G. Wright, Mr. J. N. Wright, Dr. F. Wrigley, Mr. & Mrs. G. Wyse, and Mr. S. C. Young.

the same time, and in other parts of the country, surveys of Q fever infection in cattle and cows' milk were undertaken by Dr. Slavin of the Weybridge Laboratories of the Ministry of Agriculture (Slavin, 1952). The disease in human beings and in animals was also investigated by other workers in Cardiff, Bedford, Luton, and Glasgow. This paper discusses the findings and the significance of these surveys.

The survey by Slavin covered 3,374 herds of which 6.9 per cent. in England, 2 per cent. in Wales, and 0.8 per cent. in Scotland were infected as judged by isolation of rickettsia from the herd milk. The intensity of infection varied from county to county, even allowing for uneven sampling it appeared that herds in East Anglia were much less often infected than those in Kent, Devon, Stafford, or Cheshire. In 6 infected herds 10 per cent. of 116 cows were shedding rickettsia in milk, and infection was found to persist for at least 2 years in some Kentish herds.

It is suggested that surveys of bovine sera are an insensitive method of detecting or excluding the presence of Q fever infection in cattle in countries with a level of infection such as has been described above. Serological evidence of infection with *R. burneti* has been found in sheep in several parts of Great Britain. The incidence rate from sheep killed in Kent slaughterhouses was 1.6 per cent. of 906 sheep, but in flocks associated with Q fever in the Romney Marsh it was 3.5 per cent. of 317 sheep. *R. burneti* was isolated from 2 of 96 placentae collected from ewes with serological evidence of infection and kept in the Romney Marsh. Rickettsiae were also isolated from pieces of wool collected from around the vulva of some ewes in the same flock.

The spread of infection from sheep to cattle was studied. It is concluded that there was some evidence for an association between the infection of cattle and the presence of sheep or sheep ticks, or both, in the region of Kent. The conclusion is supported by the findings in East Anglia where the sheep population is low and the cattle are infrequently infected.

Goats, pigs, and rabbits are dismissed as unimportant as reservoirs of *R. burneti*.

R. burneti has been isolated from the sheep tick *Haemaphysalis punctata* but not from *Ixodes ricinus* or *Dermacentor reticulatus*.

Limited attempts to find a reservoir of infection in small wild animals or birds were unsuccessful. Serological evidence of infection was found in chickens but there are, at present, no grounds for assuming that these birds are an important reservoir of infection in Great Britain.

The transmission of infection to man and the general epidemiology of human Q fever is thoroughly studied and discussed. From this there emerges evidence that infection in man has not been limited to those persons working with animals but has been found in all sections of the community. Sporadic cases and outbreaks of Q fever occur at any times of the year but in the areas studied were commonest in the months of April to July.

Analysis of all the information gathered by these surveys shows that sheep or cows were directly or indirectly the main source of infection. The main vehicle by which Q fever comes from cattle to man appears to be milk. Experimental investigations showed that efficient heat treatment of milk is effective in destroying rickettsiae in known infected milks. The presence of Q fever antibody was significantly higher among a group who had used raw milk during the period 1942-53 than among those who had only used pasteurised milk, from which it is concluded that unpasteurised cows' milk may well be the most important vehicle of infection.

Q fever infection can be acquired by those working amongst sheep. In the Romney Marsh area the majority of patients became ill in April, May, and June—the time when lambing, shearing, and other work with sheep is at its height. Indirect contact with sheep could be traced in patients who had contact with shepherds or other persons handling sheep.

A small outbreak of 15 cases in Cardiganshire provided additional evidence that sheep may be responsible for human Q fever infection in Great Britain. Out of the 15 patients 10 had obvious occupational exposure to animals. The remaining 5 patients had either visited farms or had some contact in their spare time with persons who were engaged in sheep farming. In an outbreak in California it was considered possible that infection was spread by dust containing *R. burneti* which was carried into town on the clothing of sheep farmers. G. F. B.

Multiplication of Attenuated Egg-adapted Distemper Virus in the Vaccinated Host. GORHAM, J., *et al.* (1957). *Vet. Med.* **6.** 289.

In the authors' main experiment ferrets were inoculated with suspensions of chorioallantoic membranes from fertile hens' eggs infected with the Onderstepoort strain of egg-adapted distemper virus. The ferrets were killed at intervals up to 21 days after inoculation, and suspensions of their spleen tissue inoculated into fresh indicator ferrets. The indicator ferrets were challenged with virulent distemper virus at least 30 days after inoculation of the spleen tissue. All the ferrets which received spleen tissue from the original ferrets killed on the 6th and 9th days post-inoculation were found to be immune. This suggested that the egg-adapted virus had multiplied in the vaccinated host sufficiently for suspensions of their spleens to be capable of immunising other ferrets.

In another experiment, also in ferrets, it was shown that the variant virus attained a higher titre (100 fold) in lung than in spleen. Using similar methods variant virus was demonstrated in the spleens and lungs of mink and foxes.

The inoculation of artificially immunised ferrets, using the same methods as in the main experiment, suggested that the variant virus did not multiply in these animals.

Distemper antiserum inoculated 24 hours prior to, but not at the same time as, egg-adapted virus, appeared to neutralise the virus in some animals so that they were not immune to subsequent challenge with virulent virus. Suspension of spleen and lung tissue from dogs killed 7 to 8 days after vaccination with variant virus produced infection in the chorioallantoic membrane of fertile hens' eggs in a 1 : 1,000 dilution. M. B. H.

The V.V.B.F. Ladies' Guild Annual General Meeting

The 27th Annual General Meeting of the Ladies' Guild was held at the Palace, Douglas, Isle of Man, on Tuesday, September 23rd, 1958, at 10.30 a.m.

The President, Mrs. K. G. R. Kelly, welcomed the following members: Mesdames Glover (Hon. Treasurer), Callender, Ingram, Cassels, Jennings, McLean, Motton, White, Davis, Tutton, Holroyd, McKellar, Corrigall, Simpson, Beynon, Lloyd, Finlay, Marshall, Thomson (Glasgow), Ritchie, Denholm, Oliver, Cool, Heath, Cremlyn-Hughes, Mills, Ferguson, Thomson (Beckenham), and Field.

Members stood in silence for a few moments in memory of the late Mrs. F. V. John of Llandilo, a very keen member of the Guild, who will be sadly missed in the South Wales Division.

Owing to illness Mrs. W. O. Jones, secretary, was unable to be present. Mrs. H. I. Field acted as deputy secretary for the meeting.

The Minutes of the last Annual General Meeting were read, confirmed, and signed.

Correspondence

A letter of apology for absence and good wishes for the Guild was received from Mrs. G. H. Wooldridge. Mr. W. O. Jones wrote saying that because of enforced inactivity his wife felt unable to continue in office as secretary and therefore tendered her resignation.

A letter from the Association Francaise des Femmes de Vétérinaires and Mrs. Jones's reply showed the similarity of aims between the French society and the Guild.

Mr. Francis wrote once again expressing the sincere and grateful thanks of the Council V.V.B.F. to the Ladies' Guild for the money raised during the previous year.

Matters Arising

It was agreed that a letter be sent to Mrs. W. O. Jones, expressing regret at her resignation and wishing her a speedy recovery.

It was also agreed that THE VETERINARY RECORD be asked to publish the names of two French children who wished for pen friends.

Treasurer's Report

Mrs. Glover said that in the absence of the secretary, she would like to thank Mrs. Kelly for all the really hard work she had done for the Guild during the past year. She had been tireless in her efforts to make this a successful year. Mrs. Glover spoke of the gratitude of the Council V.V.B.F. for the work done by the Ladies' Guild to raise money, which forms a very substantial part of its income. She herself thanked all members who had helped to make the Guild a success. Although the contribution was up from £1,100 to £1,200 this year, she urged everyone to greater efforts as still more money is needed. Letters from recipients of special donations are very sincere in their thanks, and many of them specially mention the Ladies' Guild.

Details of Amounts Received

	£	s.	d.	£	s.	d.
Proceeds of dance at Cambridge	178	14	6			
Raffle	192	9	9			
				371	4	3
Central				34	1	0
Eastern Counties				16	14	6
Lancashire and Cheshire				18	10	0
South-east Midlands				29	5	0
Midlands				8	1	6
Eire				74	4	9
Northern Ireland				49	0	0
North Wales				65	0	0
South Wales				50	0	0
National Council of Cat Fanciers				10	10	0
Treasurer's Subscriptions and Donations				56	12	6
Scottish Division Subscriptions and Donations				82	10	6
Dance at Ayr (Mrs. Wilson)				109	14	0
Dance at Dumfries (Mrs. Kennedy)				51	13	0
Dance at Penrith (Mrs. Barr)				94	15	0
Dance at Edinburgh (Mrs. Anderson)				38	15	11
Dance at Aberdeen (Mrs. Service)				54	11	7
				£1,215	3	6

It was resolved that £800 be allocated for current relief and £400 for the Special Gift Fund. Mrs. Kelly thanked Scotland, Ireland, and Wales for the handsome sums collected. She had, as President, attended meetings of the Council, V.V.B.F., and now realised how rewarding it is to be able to help those in trouble, and those left with little or no means, and how grateful those people are who have been helped in the past. She proposed a vote of thanks to Mrs. Glover for her splendid work as hon. treasurer. Mrs. Kelly said that she had enjoyed her Presidential year very much, and from the chair would like to propose Mrs. Alex Thomson to succeed her.

Election of Officers

President, Mrs. Alex Thomson (Beckenham).
Proposer: Mrs. K. G. R. Kelly; seconder: Mrs. Holroyd.

Hon. Treasurer, Mrs. R. Glover.
Proposer: Mrs. J. Ritchie; seconder: Mrs. Field.

Hon. Secretary, Mrs. H. I. Field.
Proposer: Mrs. A. Thomson (Glasgow); seconder: Mrs. G. B. S. Heath.

Hon. Auditor. It was proposed that Dr. Bell be thanked and asked if he will continue to act as hon. auditor.

SECOND SYMPOSIUM OF THE INTERNATIONAL ASSOCIATION OF VETERINARY FOOD HYGIENISTS

We are asked to state that, contrary to earlier announcements, the 2nd Symposium, to be held in Basle (Switzerland) will not take place in the autumn of 1959, but from May 15th to 21st, 1960. Further announcements will follow. This information is given by the Secretariate of the I.A.V.F.H., 1, Sterrenbos, Utrecht, Netherlands.

News and Comment

WELLCOME RESEARCH GRANTS

The Wellcome Trustees announce that among the grants sanctioned by them during the half year ended August 31st last, were the following:—

Department of Anatomy, University of Birmingham. Up to £36,500 to extend the research laboratories and animal accommodation.

Department of Zoology, University of Edinburgh. Up to £25,000 to provide additional research accommodation.

University of Western Australia. £50,000 to endow a Wellcome Research Department of Pharmacology.

Institute of Medical Research, North Shore Hospital of Sydney, Australia. Up to £17,000 to build and equip laboratories for experimental medicine and surgery.

In addition, three electron microscopes are being purchased at a cost of approximately £34,000, for indefinite loan to the following institutions: The Biophysics Research Unit of the Medical Research Council, King's College, London (Professor J. T. Randall, F.R.S.); Sir William Dunn School of Pathology, University of Oxford (Professor Sir Howard Florey, F.R.S.); The London School of Hygiene and Tropical Medicine.

PEN FRIENDS

We are asked by the Ladies' Guild to make known the names of two French children who would like to exchange letters with their British counterparts. They are: J. Rio, a 15-year-old boy from Plessala, Côtes-du-Nord, and M. Vialle, a 17-year-old girl from Meymac, Corrèze.

S.V.R. OBITUARY

We record with regret the death of the following member:—

CREMINS, John, Veterinary Practitioner, 87, Park Road, Ilford, Essex. Died October 14th, 1958, aged 56 years.

THE V.V.B.F. LADIES' GUILD

On another page is published an account of the Annual General Meeting of the Ladies' Guild, an organisation to which the entire profession is indebted. The raising of voluntary funds, especially in these days, is no easy task, and calls for hard work, organising ability, and courage. The members of the Guild have proved themselves rich in these qualities over the years, and many veterinary surgeons and their dependents who have fallen, undeservedly, on hard times have reason to be grateful to them. We commend the Guild's work most warmly to our readers, and express the hope they will support it whenever the occasion arises.

Some idea of the planning and energy the members of the Guild put into their work will be gathered from the fact that, during their dance in Douglas, during Congress week, the tombola alone produced £100, thanks, in particular, to the efforts of Mrs. Kelly, Mrs. Glover, and Mrs. Motton. In particular, the Ladies' Guild wish to express their gratitude to those who gave the many delightful prizes.

JURY SERVICE IN NORTHERN IRELAND

Further to the paragraph on this subject which was published in our issue of October 4th, we are indebted to Dr. J. K. L. Pearson for a correction, so far as jury service in Northern Ireland is concerned. He writes:—

In Northern Ireland there is separate legislation regarding jury service and the veterinary surgeon. Under the Juries Act of 1953 no member of the Royal College of Veterinary Surgeons and no person for the time being registered in the supplementary register shall be called for jury service. Such persons in Northern Ireland are automatically included in the list of those who are exempt from serving on juries and have since 1953 been placed in the Third Schedule to the Jury Laws Amendment Act (Northern Ireland), 1926, which relates to exemption from serving on juries.

PERSONAL

Mr. T. Stewart, veterinary adviser to Benger Laboratories Limited, has been invited to address delegates at the Dutch Veterinary Congress. Mr. Stewart, who will be the only British speaker at the Congress, will base his lecture on his paper, "The Rationale of Parenteral Iron Therapy in the Treatment of Iron Deficiency Anaemia in Piglets," which was published recently in *Tijdschrift Voor Dietgeneeskunde* (the Dutch veterinary journal).

Mr. J. L. Shaw has been transferred from Leeds to Tolworth on promotion to Divisional Veterinary Officer.

Births

BROUGHTON.—On October 8th, 1958, to Jean, wife of J. E. Broughton, B.V.SC., M.R.C.V.S., "The Cedars," Ringwood, Hants., a son, David John Eugene, brother for Paul.

HARRISON.—On October 4th, 1958, to Heather, wife of N. J. Harrison, M.R.C.V.S., "Fairview," Ashburton, a son, Martin John, brother for Gail.

HAYES.—On October 15th, 1958, to Joan (*née* Gilbert), wife of Harry Hayes, M.R.C.V.S., 51, Leicester Road, Hinckley, Leics., a son, Timothy Michael, brother for Robert, John, Christopher, and Jimmy.

Engagement

MALONE—WOOLSEY.—The engagement is announced between James Carruthers Malone, B.SC., M.R.C.V.S., only son of Mr. and Mrs. J. Malone of Wiesbaden, Germany, and Pamela Kathleen Woolsey, only daughter of Mr. D. W. Woolsey of Mundesley, Norfolk.

COMING EVENTS

October

30th (Thurs.). Meeting of the Western Counties Veterinary Association at the Rougemont Hotel, Exeter, 2.30 p.m.

31st (Fri.). Scottish Metropolitan Division Ladies' Guild Annual Dance in the Milton House Hotel, Willowbrae Road, Edinburgh, 8 p.m.

November

5th (Wed.). Ordinary General Meeting of the Sussex Veterinary Society at the Old Ship Hotel, Brighton, 2.30 p.m.

6th (Thurs.). General Meeting of the Central Veterinary Society at the Royal Veterinary College, 6 p.m.

7th (Fri.). Autumn Meeting of the Eastern Counties Veterinary Society at the Angel Hotel, Bury St. Edmunds.

General Meeting of the Yorkshire Veterinary Society at the Hotel Metropole, Leeds, 2.30 p.m.

14th (Fri.). General Meeting of the Midland Counties Veterinary Association at the Birmingham Medical Institute, 36, Harborne Road, Birmingham, 15, 2.15 p.m.

20th (Thurs.). Joint Meeting of the Sussex Veterinary Society and the Mid-Sussex Division of the B.M.A. at the Dudley Hotel, Brighton, 8 p.m.

Annual Dance of the V.V.B.F. County of Ayr Ladies' Guild in Western House, Ayr.

27th (Thurs.). Annual Dance of the V.V.B.F. North of Scotland Division in the Northern Hotel, Aberdeen, 7.30 p.m.

BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS IN LONDON

Wednesday, November 19th—No. 7, Mansfield Street

10.15 a.m. Finance Sub-committee.
11.45 a.m. Parliamentary and Public Relations Committee.
2.00 p.m. Small-Animals Committee.
4.00 p.m. Farm Livestock Committee.

Thursday, November 20th—No. 7, Mansfield Street

10.00 a.m. Veterinary State Medicine Committee.
11.30 a.m. Home Appointments Committee.
2.15 p.m. General Purposes and Finance Committee.

Friday, November 21st—Connaught Rooms

10.15 a.m. Council Meeting.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Dorset. Clover Farm, Portesham, Weymouth (Oct. 17).
Dumfries. Townhead, Parkgate (Oct. 15).
Salop. Rodington House Farm, Rodington, Shrewsbury (Oct. 14).

Foot-and-Mouth Disease

Wilts. Baycliffe Dairy Farm, Maiden Bradley, Warminster (Oct. 18).

Fowl Pest

Beds. 1 Silsoe Road, Clophill (Oct. 14).
Berks. 13, Woodlands Park Avenue, Maidenhead (Oct. 16).
Cambs. Bury Fruit Farm, Melbourn; The Pear Tree, Guilden Morden (Oct. 18).
Cardigan. Trefigin Manor, St. Dogmaels (Oct. 14).
Essex. New Hall Farm, Purleigh, Chelmsford (Oct. 14).
Herts. Sheering Lower Road, Sawbridgeworth (Oct. 17); Covegate, Anstey, Buntingford (Oct. 18).
Hunts. Glebe House, Church Street, Fenstanton (Oct. 17); Woolpack Farm, Hemingford Grey (Oct. 20).
Lancs. Church Road Poultry Run, Kearsley (Oct. 14).
Lincs. Woolsthorpe-by-Colsterworth, Grantham (Oct. 16).
Norfolk. Bray Farm, Sutton, Norwich (Oct. 14); The Mill, Mill Street, Necton, Swaffham; Sunny Haven, Necton (Oct. 15); Rose Cottage, Catfield, Great Yarmouth (Oct. 16); Sutton Turkey Farm, Stalham, Norwich (Oct. 17).
Notts. Moorfields Farm, Oxten, Newark (Oct. 14).
Worcs. Hillcrest, Middle Road, Dodford, Bromsgrove (Oct. 14); West Brook, Victoria Road, Dodford, Bromsgrove (Oct. 15); Hill Top Poultry Farm, Warbage Lane, Dodford (Oct. 17).
Yorks The Close, Manse Lane, Knaresborough (Oct. 20).

Swine Fever

Berks. Riseley Farm, Swallowfield, Reading (Oct. 15).
Cambs. Upherds Lane, Ely (Oct. 20).
Ches. Yew Tree Farm, Poulton (Oct. 14); Fields Farm, Bradley, Malpas; The Dene, Warrington Road, Great Budworth, Northwich (Oct. 16); Wickstead Old Hall, Wirswall, Whitchurch (Oct. 17).
Denbigh. Lower Rackery Farm, Burton, Wrexham (Oct. 14).
Essex. Plains Farm, Boxted, Colchester (Oct. 14); Gatehouse Farm, Ongar Road, Dunmow (Oct. 20).
Flints. Pentre Isglan Farm, Greenfield, Holywell (Oct. 20).
Lancs. Croft Farm, Davyhulme, Urmston (Oct. 16); Plot at back of Dorothy Street, St. Helens (Oct. 20).
Norfolk. Bee-mar, Nursery Lane, Hockwold, Thetford (Oct. 14); King Street, Neatishead, Norwich; London Road, Besthorpe, Attleborough; Oakleigh Grange Farm, North Green, Pulham St. Mary, Diss (Oct. 15); French Church Farm, Caister St. Edmunds, Norwich (Oct. 17); Tanmere Farm, Harsham Road, Attleborough; Eastgate, Cawston, Norwich; Home Farm, Suton, Wymondham; Park Lane, Deopham, Wymondham (Oct. 20).
Suffolk. Lark Rise, Hemley, Ipswich (Oct. 17); Belle View, Laxfield, Woodbridge (Oct. 20).
Worcs. Lane End Farm, Rock, Kidderminster; Brockhill Farm, Redditch (Oct. 20).

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 30th September, 1958		7	—	—	34	—	34
Corresponding period in	1957	3	—	24	39	—	37
	1956	28	—	17	29	—	27
	1955	26	1	—	18	—	31
1st January to 30th September, 1958		119	5	114	537	—	990
Corresponding period in	1957	257	6	64	620	—	727
	1956	1,146	8	116	516	—	592
	1955	549	5	6	401	—	1,138

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Y.M.C.A. Greater London Development Plan

Sir,—I ask for the courtesy of your columns to express appreciation of Professor Bosworth's commendation, in your last issue, of the Y.M.C.A.'s Greater London Development Plan. This is a bold and practical effort to provide residential accommodation for the increasing number of young men coming to London from all parts of this country and abroad for study, training, and work. These strangers within our gates are of all races, colours, and creeds. All seek comfortable sleeping quarters, facilities for study, recreation in congenial surroundings, and companionship. The Plan is to double the capacity of present hostels by extensions to seven and four new buildings. A start has been made, and the Plan will proceed as fast as funds become available. The sum of £350,000 is still needed.

May I add my commendation to that of the President and invite your readers who live in the Greater London area to see this as a cause worthy of generous support. Contributions should be sent to the General Secretary, National Council of Y.M.C.A.s, 112, Great Russell Street, London, W.C.1.

Yours faithfully,
RUPERT NEVILL,
President.

Metropolitan Union of Y.M.C.A.s,
37, Bedford Square,
London, W.C.1.
October 21st, 1958.

Focal Symmetrical Encephalomalacia in Lambs

Sir,—Hartley (1956) described a condition in lambs in New Zealand which he called focal symmetrical encephalomalacia. In a number of cases the condition occurred on farms together with enterotoxaemia, and whilst the aetiology is obscure both this author and Innes and Saunders (1957) have discussed the suggestion of an association between the two conditions.

The purpose of this letter is to record the occurrence in Britain of a condition of similar clinical appearance and pathology.

The trouble was confined to a single hirsel of Blackfaces depastured on open hill ground in S. Scotland. Deaths occurred in lambs 5 days to 5 weeks old, often without prior illness being observed. A few lambs, however, were seen to be affected with a condition characterised by dullness, blindness, and ataxia, the duration of illness rarely exceeding 12 hours. Two such animals were available for examination and the principal findings were as follows:—

Both lambs showed extreme dullness and forced respiratory movements. Rectal temperatures were 102.4 to 104.0° F. respectively. The ears were drooping and the eyes dull with congested conjunctivae. There was little response to light. Both animals were apparently blind and deaf and would stand "head-pressing" against the wall for long periods. They showed little inclination for voluntary movement but could be coaxed into an aimless, stumbling walk. In some respects the appearance was similar to that seen in swayback, apart from the extreme dullness.

At *post mortem* no gross lesions were found other than in the brain where transverse slices through the internal capsules and basal ganglia revealed the presence of focal lesions of softening with ragged borders, grey-yellow to light brown in colour and flecked with extravasated blood. Histologically the lesions consisted of fragmented necrotic white matter, containing a few astrocytes, red blood cells, and structureless eosinophilic globules, and infiltrated by large numbers of compound granular corpuscles and rod cells, together with occasional neutrophils and eosinophils. Mild perivascular cuffing and endothelial swelling were present in the vicinity of the lesions. Biological and bacteriological examination of both brains was negative.

The lambs had been inoculated with pulpy kidney vaccine at birth and in all 30 deaths occurred. A further 6 were fully examined and in 2 the deaths were attributable to pulpy kidney disease whilst the other 4 showed severe lamb dysentery lesions of a chronic nature. Only one of the 6 was seen to exhibit nervous signs but in none were brain lesions observed.

These findings suggest that focal symmetrical encephalomalacia may occur in this country.

Yours faithfully,
R. M. BARLOW.

The Edinburgh and East of Scotland College of Agriculture,
13, George Square,
Edinburgh, 8.
October 10th, 1958.

References

HARTLEY, W. J. (1956). *N.Z. Vet. J.* **4**. No. 4. 129.
INNES, J. P. M., & SAUNDERS, L. Z. (1957). "Advances in Veterinary Science, III." Edited by C. A. Brandly and E. L. Jungherr, New York, 1957. 83.

"Tranquillising" for Shows

Sir,—I have recently received an advertising pamphlet from one of the well-known veterinary wholesalers giving details of yet another new "tranquilliser." Amongst the indications for use of the drug is mentioned the "tranquillising" of nervous dogs at shows. Surely this is tantamount to doping?

It is to be hoped that no members of our profession will prescribe or supply drugs for such purposes.

Yours faithfully,
LUCY R. ROBINSON.

The Grey House,
Purleigh,
Nr. Chelmsford,
Essex.
October 9th, 1958.